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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* FANGLI HAO, ALBERT R. ELLINGBOE and  
ERIC H. LENZ

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Appeal 2008-3717  
Application 10/040,326  
Technology Center 1700

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Decided: November 5, 2008

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Before EDWARD C. KIMLIN, BRADLEY R. GARRIS, and  
MICHAEL P. COLAIANNI *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 22, 23, 25, 27-32, 34-37, 39, 41-45, 47, 49, 51, 52, 54, 55, 60, 61, 63 and 65-68. Claims 38, 40 and 62 stand withdrawn from consideration. Claim 22 is illustrative:

22. A pedestal for supporting a substrate during plasma processing, said pedestal comprising:

an electrode configured for generating an electric field;

a chuck disposed above said electrode, said chuck being configured for holding said substrate;

a generally planar edge ring disposed above said electrode and extending underneath a substrate when positioned on said chuck, said edge ring being formed from a dielectric material and configured for shielding said electrode and said chuck with inner edge portions proximate an edge of said substrate and an edge of said chuck and an outer edge portion extending to one edge of said electrode; and

an impedance matching layer disposed and confined between said electrode and said edge ring and underneath said substrate when said substrate is resting on said pedestal, said impedance matching layer being entirely planar and parallel with a top surface of the electrode and a bottom surface of the edge ring, said impedance matching layer being bonded to said electrode or said edge ring, said impedance matching layer having characteristics or features configured for controlling an impedance between said electrode and a plasma, said impedance being arranged to affect said electric field, wherein a first impedance produced through said chuck is different than a second impedance produced through said edge ring, and wherein said impedance matching layer is configured to alter said second impedance produced through said edge ring so that said second impedance is substantially equal to said first impedance produced through said chuck, the equalization of said impedances improving processing uniformity across the surface of said substrate by coupling energy more uniformly across the surface of the substrate.

The Examiner relies upon the following references as evidence of obviousness:

Tamura	5,792,304	Aug. 11, 1998
Ohmi (as translated)	WO 98/39500	Nov. 9, 1998
Masuda	6,171,438 B1	Jan. 9, 2001

Appellants' claimed invention is directed to a pedestal for supporting a substrate during plasma processing. The pedestal comprises, *inter alia*, an impedance matching layer that is disposed between the electrode and an edge ring and underneath the substrate when the substrate rests upon the pedestal. The impedance matching layer controls the impedance between the electrode and the plasma such that the impedance produced through the edge ring is substantially equal to the impedance produced through the chuck. According to Appellants, "[t]he equalization of the impedance between the edge ring (156) and the chuck (154) improves the processing uniformity across the surface of the substrate (160) by coupling energy more uniformly across the surface of the substrate (160)" (App. Br. 4).

Appealed claims 22, 23, 25, 27-32, 49, 51, 52, 54, 55, 60, 61, 63, 65 and 66 stand rejected under 35 U.S.C. § 112, first and second paragraphs. Claims 22, 23, 25, 27-32, 34-37, 39, 41-43, 47-49, 51-55 and 65-67 stand rejected under 35 U.S.C. § 103(a) as being unpatentable under Tamura in view of Ohmi. Claims 44, 45, 60, 61, 63, and 68 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Tamura in view of Ohmi and Masuda.

We have thoroughly reviewed the respective positions advanced by Appellants and the Examiner in reaching our decision to affirm-in-part the Examiner's rejections.

The Examiner's § 112, first and second paragraph rejections involve the same issue regarding claim interpretation. It is the Examiner's position that the original Specification fails to provide written descriptive support for the edge ring positioned on the chuck, and it is not clear from the Specification that the edge ring is positioned on the chuck. For instance,

claim 22 recites “a generally planar edge ring disposed above said electrode and extending underneath a substrate when positioned on said chuck” (third paragraph.).

It is well settled that claim language is not to be read in a vacuum but in light of the Specification as it would be read by one of ordinary skill in the art. *In re Sneed* 710 F.2d 1544, 1548 (Fed Cir. 1983); *In re Moore* 439 F.2d 1232, 1235 (Fed. Cir. 1971). In the present case, we agree with the Appellants that the relevant claim language “is definite in specifying, when read in context, that the substrate is positioned on the chuck and not the planar edge ring as contended by the Examiner” (App. Br. 7, fourth paragraph). While we understand that the Examiner may literally read the claim language as positioning the edge ring on the chuck, we find that a more reasonable reading supports Appellants’ interpretation that the edge ring is disposed above the electrode when the substrate is positioned on the chuck. Appellants should make good on their offer of amending the claims to remove any ambiguity.

We now turn to the Examiner’s § 103 rejection. While Tamura discloses a pedestal for supporting a substrate during plasma processing that comprises some of the presently claimed elements, the Examiner acknowledges that Tamura does not disclose Appellants’ impedance matching layer between the electrode and the edge ring. Hence, the Examiner cites Ohmi for teaching a pedestal comprising an impedance matching layer 104 disposed between an electrode 101 and an edge ring 103, and, therefore, arrives at the legal conclusion of that “it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the pedestal of the Tamura et al as to comprise an

impedance matching layer disposed between the electrode and the edge ring” (Ans. 8, first paragraph). However, Appellants accurately point out that electrode 103 of Ohmi “ does not extend underneath the substrate 108 positioned on a base of electrode 101, nor does electrode 103 proximately abut an edge of the substrate and an edge of the chuck as claimed” (App. Br. 9, third paragraph). Appellants also properly point out that “electrode 103 is positioned on impedance matching layer 104 which does not extend underneath the substrate when the substrate is resting on the pedestal 101a” (*id*). Accordingly, even if Ohmi would have provided the requisite suggestion of including an impedance matching layer in the pedestal of Tamura, there is no teaching of positioning the impedance matching layer underneath the substrate when it rests on the pedestal. In addition, the Examiner has not advanced any rationale why it would have been obvious to one of ordinary skill in the art to modify the pedestal of Tamura such that it comprises an impedance matching layer at the location claimed by Appellants. The Examiner’s only retort to Appellants’ argument is that “one can not show nonobviousness by attacking references individually where the rejections are based on combinations of references” (Ans. 13). Manifestly, it is incumbent upon the Examiner to establish that the combination of prior art elements results in the claimed invention.

The § 103 rejection of claims 34-37, 39, 41-45 and 47 is another matter.<sup>1</sup> Appellants’ arguments are not commensurate in scope with the degree of protection sought by these claims. For instance, claim 34 fails to recite that the electrode extends underneath the substrate when the substrate

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<sup>1</sup> Since Appellants have not presented separate arguments for any of these claims, the group of claims stand or fall together with claim 34.

rests upon the pedestal. Also, although Appellants maintain that “nor does electrode 103 proximately abut an edge of the substrate and an edge of the chuck as claimed”, no such recitation appears in claim 34. Claim 34 recites “an electrode for generating an electric field between a plasma and said electrode said electrode having an inner region and an outer region [and] an edge ring disposed above said outer region of said electrode and positioned next to a side of said chuck”. Electrode 103 of Ohmi, which can be fairly considered an edge ring, is disposed above the outer region of the electrode and positioned next to the side of a chuck. Accordingly, we agree with the Examiner that the combined teachings of Tamura and Ohmi would have rendered obvious the subject matter defined by these claims.

In conclusion, based on the foregoing, the Examiner’s rejections under 35 U.S.C. § 112, first and second paragraphs, are reversed. The Examiner’s § 103 rejection of claims 22, 23, 25, 27-32, 49, 51, 52, 54, 55, 60, 61, 63 and 65-68 is also reversed. The Examiner’s § 103 rejection of claims 34-37, 39, 41-45 and 47 is sustained. Accordingly, the Examiner’s decision rejecting the appealed claims is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED-IN-PART

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